
Installation

Installing the Data Access Card in system option 11

The DAC is fully supported in any card slot in either the main or expansion cabinet of system option 11 without any hardware modification. Insert the DAC into any available card slot and secure it in place using the locklatches.

To cable out the DAC on system option 11, run a standard 25-pair cable to the cross connect, or use one of the following breakout cables in conjunction with an Amphenol 50-pin female-to-female gender converter:

- QCAD318A 50-pin Amphenol to 6 female DB25 connectors
- QCAD319A 50-pin Amphenol to 6 male DB25 connectors

For information on the programming of the DAC, see “Configuring the Data Access Card”.

Note: For system option 11, the format to be used in response to the “TN” prompt must be one of the following:

	CC 00 00 UU	CC - Card Slot
or	CC UU	UU - Unit Number

Installing the Data Access Card in system options 21, 51, 61, 71, and 81

In most Meridian 1 system options 21, 51, 61, 71, and 81, the DAC is fully supported in IPE modules. These special slots on the DAC have 24-pair cables pre-wired to the Main Distribution Frame (MDF) in card slots 0-15. Any IPE slot will support the first four ports on the DAC if connections are made at the MDF. Most IPE modules can be upgraded to wire 24-pair cables to the MDF for all card slots.

Note: For directions concerning the pinouts for the MDF, refer to *System installation* (553-3001-210).

Before you begin, power down:

- the IPE module only, if it is a DC-powered system
- the entire column, if it is an AC-powered system

It is recommended that you begin the installation from the right hand side (when facing the backplane), starting with slot 0 and moving towards slots on the left side. If you wish to add more than six DACs, and require slots 8 through 15, remove the input/output (I/O) panel. Be aware that a full shelf installation can take up to 3 hours. You need the following equipment to upgrade the cabling:

- A0359946 Amphenol cables
 - These connectors include all the connector and screw apparatus.
 - You need one cable for each DAC.
- cable ties
- wire cutters
- A3/16 nutdriver

System compatibility

To support the 24-pair requirement of the DAC, some cabling may need to be upgraded ([Table 11](#)). See “Upgrading systems” for more information.

Ports 0, 1, 2, and 3 of the DAC work in any standard 16-pair IPE slot (connect directly to the MDF).

An upgraded backplane has three shrouds for each card slot. A backplane that cannot be upgraded has only two shrouds for each card slot.

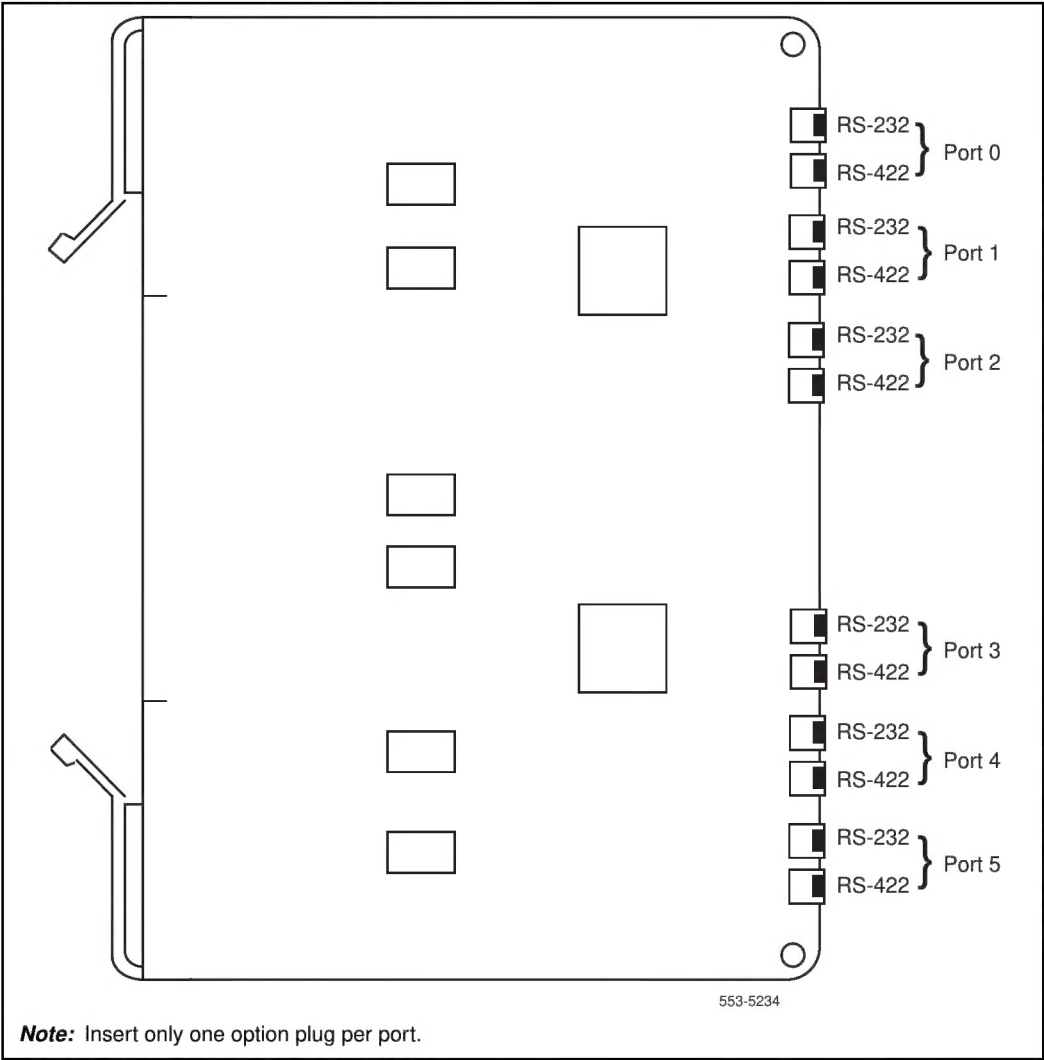
Table 11
System option compatibility with the DAC

System option	Backplane code	Backplane release	Upgrade	Maximum no. of ports/DAC supported
21/21A	NT8D1102	6 and below	No	4
21/21A	NT8D1102	7 and above	Yes	6
51/61/71	NT8D3701	3 and below	No	4
51/61/71	NT8D3701	4 and above	Yes	6

Port configuration

[Figure 10](#) shows the port configurations for both the RS-232-C and RS-422 ports. The software configuration requirements for the DAC are shown at the end of this chapter. Responses to the prompts listed are required. Depending on the configuration, ensure that the option plug is set for RS-232 or RS-422.

Figure 10
NT7D16 Data Access Card port connectors



Cabling

Several cabling schemes are possible for both AILC and RILC modes. Typical capacitance for 24- and 26-gauge cables is shown in the [Tables 12](#) and [13](#). RS-232 and RS-422 transmission distance is limited by the electrical capacitance of the cable. Low-capacitance cable carries a digital signal further than a high-capacitance cable.

Table 12

RS-232-C maximum line capacitance 2,500 μ F

Gauge	Capacitance per foot (μ F)	Max distance
24	24	104
26	15	166

Table 13

RS-422 maximum line capacitance 60,000 μ F

Gauge	Capacitance per foot (μ F)	Max distance
24	24	2500
26	15	4000

[Figure 11](#) shows the cabling choices available. It includes cabling with the RS-232-C cable, associated patch panel, the RJ-11, and the octopus cable. Each scheme can be tailored to suit individual needs, and specific alternatives are shown in later figures.

Figure 11
Cabling to the data equipment

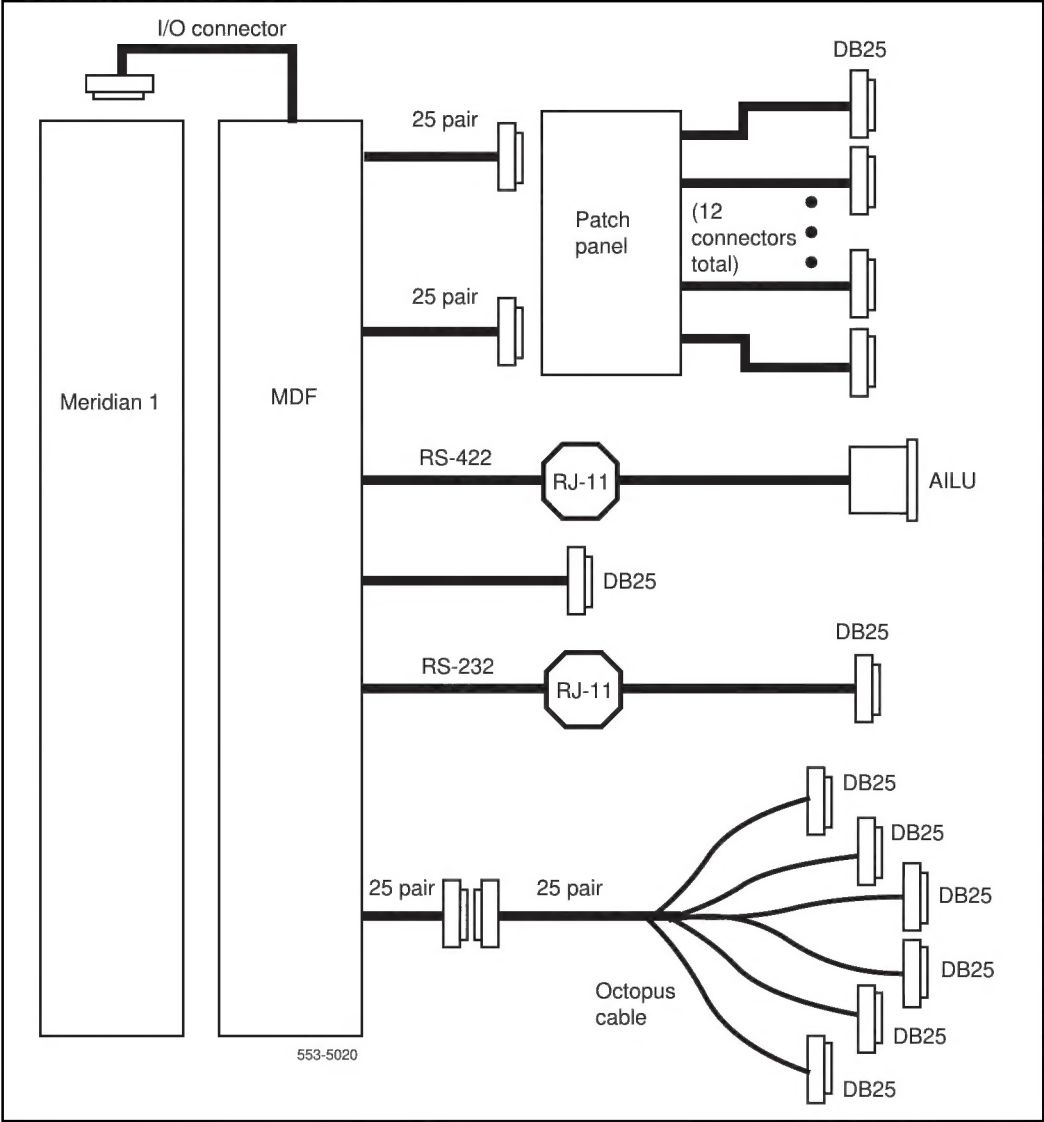


Figure 12 shows a connection through an RJ-11 or RJ-45 jack located at the data station. It is recommended that four wires be used similarly to the AIM drop when using the RJ-11 jack. Another cable is required to convert the RJ-11 or RJ-45 into DB25.

Note: It is necessary to turn over Receive Data and Send Data between the DAC and the AILU. This is done on the TN at the MDF.

Figure 12
RJ-11 or RJ-45 jacks

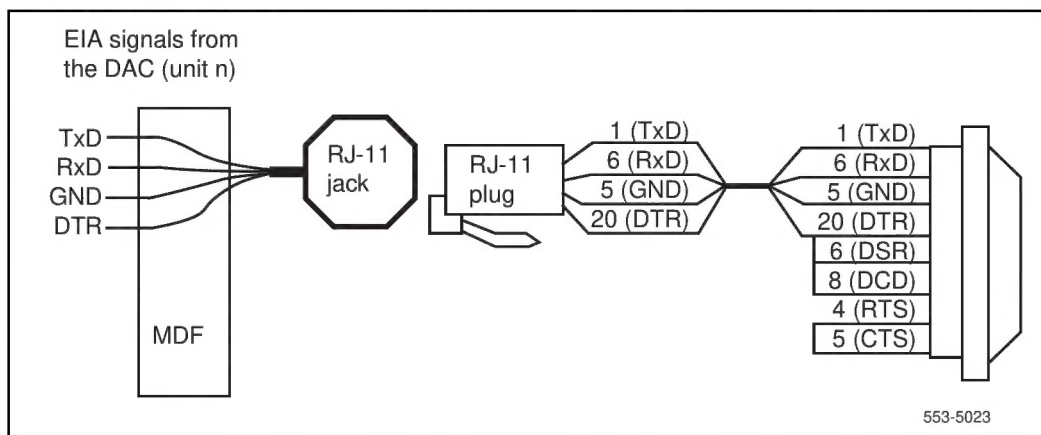
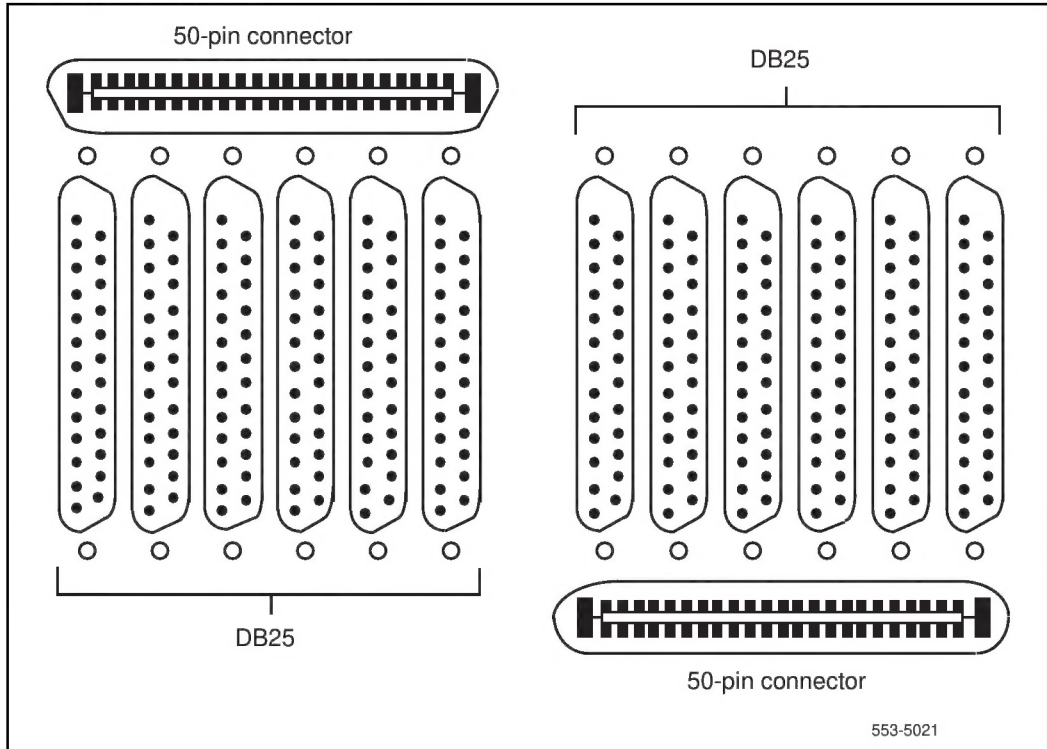


Figure 13 illustrates the patch panel. RS-232-C cables are used to connect the data equipment to the patch panel. This particular panel shows two 50-pin connectors into twelve DB25. The signals from the MDF travel on 25-pair cables, terminating at the patch panel.

Note: Use patch panels that follow the pinout of the DAC.

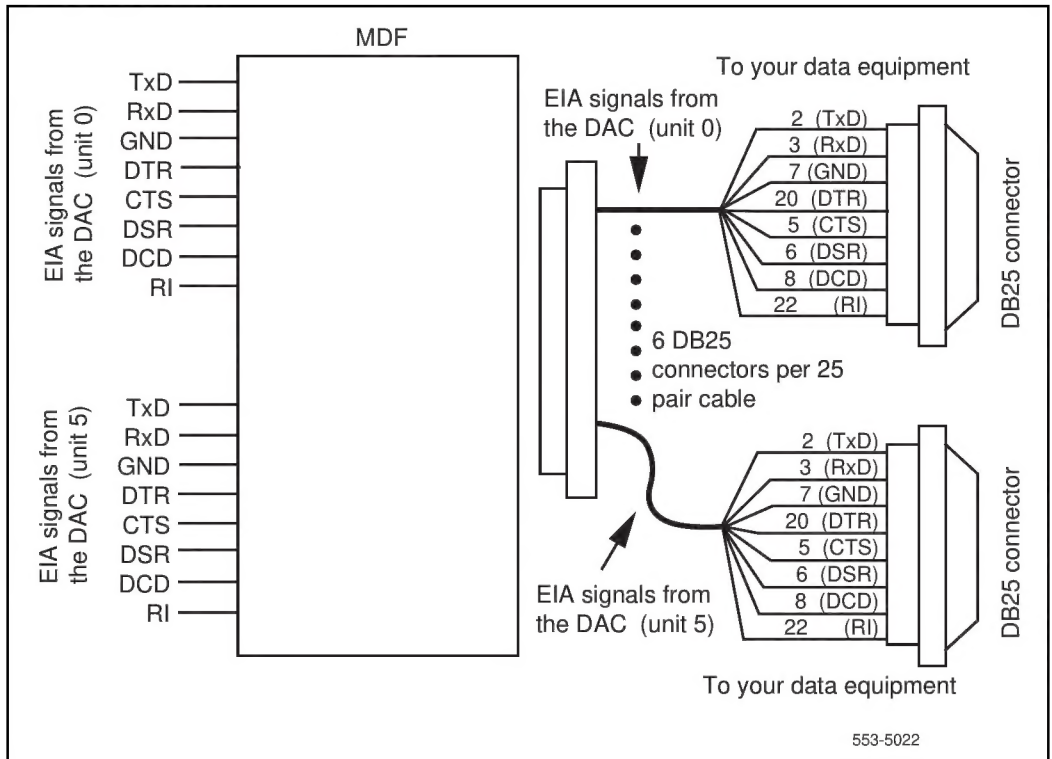
Figure 14 describes an octopus cabling scheme. This cable replaces the combined patch panel and RS-232-C cabling scheme. The 25-pair cable is split into six RS-232-C male or female connectors. This allows direct connections to the data equipment from the Meridian 1 I/O panel. The octopus cable allows for the maximum segregation of the voice signals that might otherwise be present within the same 25-pair cable.

Figure 13
Patch panel layout



Note: Use an octopus cable that follows the pinout of the DAC, such as QCAD318A (female) and QCAD319A (male), in conjunction with a 50-pin female-to-female gender converter.

Figure 14
Octopus cabling



Backplane pinout and signaling

Two 40-pin, and two 20-pin edge connectors connect the card to the backplane. The detailed pinout configurations are listed in [Tables 14](#) and [15](#).

Table 14
RS-232-C and RS-422 pinouts for first three DAC ports (Part 1 of 2)

I/O cable			Unit no.	RS-232-C		RS-422 Signal	Patch pair or octopus
Pair	Pin	Pair color		Signal	Pin no.		
1T	26	W-BL	UNIT 0	TD0	2	RDA0	Connector 1
1R	1	BL-W		RD0	3	RDB0	
2T	27	W-O		DTR0	20	SDA0	
2R	2	O-W		GND0	7	SDB0	
3T	28	W-G		DCD0	8		
3R	3	G-W		DSR0	6		
4T	29	W-BR		RI0	22		
4R	4	BR-W	UNIT 1	CTS0	5		Connector 2
5T	20	W-S		TD1	2	RDA1	
5R	5	S-W		RD1	3	RDB1	
6T	31	R-BL		DTR1	20	SDA1	
6R	6	BL-R		GND1	7	SDB1	
7T	32	R-O		DCD1	8		
7R	7	O-R		DSR1	6		

Note 1: The RS-232 pinout follows the standard set by the QPC723 RILC.

Note 2: The RS-422 pinout follows the standard set by the QPC430 AILC (first pair: Receive Data; second pair: Send Data). Receive and Send are designated with reference to the DTE; therefore, they must be turned over in the cross-connect since most DTE have first pair as Send Data and second pair as Receive Data.

Table 14
RS-232-C and RS-422 pinouts for first three DAC ports (Part 2 of 2)

I/O cable			Unit no.	RS-232-C		RS-422 Signal	Patch pair or octopus
Pair	Pin	Pair color		Signal	Pin no.		
8T	33	R-G	UNIT 2	RI1	22	RDA2 RDB2 SDA2 SDB2	Connector 3
8R	8	G-R		CTS1	5		
9T	34	R-BR		TD2	2		
9R	9	BR-R		RD2	3		
10T	35	R-S		DTR2	20		
10R	10	S-R		GND2	7		
11T	36	BK-BL		DCD2	8		
11R	11	BL-BK		DSR2	6		
12T	37	BK-O		RI2	22		
12R	12	O-BK		CTS2	5		

Note 1: The RS-232 pinout follows the standard set by the QPC723 RILC.

Note 2: The RS-422 pinout follows the standard set by the QPC430 AILC (first pair: Receive Data; second pair: Send Data). Receive and Send are designated with reference to the DTE; therefore, they must be turned over in the cross-connect since most DTE have first pair as Send Data and second pair as Receive Data.

Table 15
RS-232-C and RS-422 pinouts for last three DAC ports (Part 1 of 2)

I/O cable			Unit no.	RS-232-C		RS-422 Signal	Patch pair or octopus
Pair	Pin	Pair color		Signal	Pin no.		
13T	38	BK-G	UNIT 3	TD3	2	RDA3	Connector 1
13R	13	G-BK		RD3	3	RDB3	
14T	39	BK-BR		DTR3	20	SDA3	
14R	14	BR-BK		GND3	7	SDB3	
15T	40	BK-S		DCD3	8		
15R	15	S-BK		DSR3	6		
16T	41	Y-BL		RI3	22		
16R	16	BL-Y		CTS3	5		
17T	42	Y-O	UNIT 4 (Note)	TD4	2	RDA4	Connector 2
17R	17	O-Y		RD4	3	RDB4	
18T	43	Y-G		DTR4	20	SDA4	
18R	18	G-Y		GND4	7	SDB4	
19T	44	Y-BR		DCD4	8		
19R	19	BR-Y		DSR4	6		
20T	45	Y-S		RI4	22		
20R	20	S-Y		CTS4	5		
21T	46	V-BL	UNIT 5 (Note)	TD5	2	RDA5	
21R	21	BL-V		RD5	3	RDB5	
22T	47	V-O		DTR5	20	SDA5	

Note: Units 4 and 5 are available when the DAC is installed in a fully wired 24-pair slot.

Table 15
RS-232-C and RS-422 pinouts for last three DAC ports (Part 2 of 2)

I/O cable			Unit no.	RS-232-C		RS-422 Signal	Patch pair or octopus
Pair	Pin	Pair color		Signal	Pin no.		
22R	22	O-V		GND5	7	SDB5	Connector 3
23T	48	V-G		DCD5	8		
23R	23	G-V		DSR5	6		
24T	49	V-BR		RI5	22		
24R	24	BR-V		CTS5	5		
Note: Units 4 and 5 are available when the DAC is installed in a fully wired 24-pair slot.							

Configuring the Data Access Card

LD11 must be configured to accept the DAC. The commands listed here must be answered. LD20 prints out card information when requested. For a complete list of the service change prompts and responses, see *X11 input/output guide* (553-3001-400).

DAC administration (LD11)

Responding R232 or R422 to the TYPE prompt in LD11 begins the prompt sequence for the DAC configuration. Responses to the following prompts are required. The defaults are bracketed, and may be issued by Carriage Return (<CR>).

Table 16
???—was not numbered or titled in Word file (Part 1 of 3)

Prompt	Response	Comments
REQ	NEW, CHG, MOV, COPY	Add, change, move or copy the unit
TYPE	R232, R422	R232 = the RS-232-C unit R422 = the RS-422 unit
TN	LL S CC U	DAC data TN. The loop (LL) must be a superloop.
RNPG	<CR>	Ringing number pickup group (default to zero)
CLS	DTA ADD	The class of service allowed for the DAC. These are the required responses. DTA = data allowed ADD = digit display allowed (optional)
TOV	(0), 1, 2, 3	Timeout value 0 = no timeout 1 = 15 minutes 2 = 30 minutes 3 = 60 minutes
OPE	YES, (NO)	Operation parameter change
PAR	(SPAC), ODD, EVEN, MARK	SPAC = space parity ODD = odd parity EVEN = even parity MARK = mark parity
DTR	ON, (OFF)	DTR settings ON = forced DTR OFF = dynamic DTR This prompt appears only if TYPE = R232
HOT If HOT = ON, then AUTB = OFF	ON, (OFF)	Hotline

Table 16
???—was not numbered or titled in Word file (Part 2 of 3)

Prompt	Response	Comments
AUT	OFF, (ON)	Automatic answer
AUTB	OFF, (ON)	Autobaud Prompt appears only if HOT - OFF
BAUD	0, 1, 2, 3, 4, 5, 6, (7), 8	Baud rate 0 = 110 1 = 150 2 = 300 3 = 600 4 = 1200 5 = 2400 6 = 4800 7 = 9600 8 = 19200 This prompt appears only if AUTB = OFF.
DCD	OFF, (ON)	DCD settings OFF = forced DCD ON = dynamic DCD This prompt appears only if TYPE = R232.
PRM	OFF, (ON)	Prompt mode OFF = no prompt (Host) mode ON = prompt (Terminal) mode
DEM	DTE, (DCE)	Data Equipment mode This prompt appears only if TYPE = R232.
DLNG	FRN, (ENG)	Data port language FRN = Quebec French ENG = English
KBD	OFF, (ON)	Keyboard dialing OFF = disabled (Hayes dialing commands will still work) ON = enabled

Table 16**???—was not numbered or titled in Word file (Part 3 of 3)**

Prompt	Response	Comments
WIRE	ON, (OFF)	Wire test mode ON = enabled OFF = disabled
PBDO	ON, (OFF)	Port busy upon DTR off ON = enabled (port busy off with DTR) OFF = disabled (port busy on with DTR) This prompt appears only if TYPE = R232 PBDO = OFF for any RS-232-C mode besides 8, or 12 If PBDO = ON, key 7 = MSB
KEY	0 SCR xxxx 1 SCR xxxx 2 TRN 3 ADL yy xxxx 4 RGA 5 SCC 0-253 6 DSP 7 MSB	Key settings Primary data DN Secondary Data DN Call Transfer Autodial Ring Again Speed Call Controller, list number Display Make Set Busy Primary and secondary data DNs must be single appearance DNs. Feature key assignment must be as shown here.

Printing the card parameters (LD20)

By responding R232, R422, or DAC to the TYPE prompt in LD20, you can print out the configured parameters for each port, or the entire DAC. This is useful to determine if any parameters have been altered during keyboard or Hayes dialing modify procedures.

Table 17
???—was not numbered or titled in Word file

Prompt	Response	Comments
REQ	PRT, LTN, LUU	Print data, TN, or unit information for the unit specified
TYPE	R232, R422, DAC	Print information for the RS-232-C, RS-422 ports, or the whole DAC
TN	LL S CC U	Print information for this TN. Uploaded parameters can only be printed when a specific TN is listed.

The operation parameter printout for an RS-232 or RS-422 port is similar to the following, depending on the configuration.

Table 18
???—was not numbered or titled in Word file

	DBASE R-232 or R-422	UPLOAD R-232 or R-422
PAR	SPAC	SPAC
DTR	ON	ON
HOT	OFF	OFF
AUT	ON	O
AUTB	ON	ON
BAUD	9600	4800
DCD	OFF	OFF
PRM	KBD ON	KBD ON
DEM	DCE	DCE
DLNG	FRN	FRN
KBD	ON	ON
WIRE	OFF	OFF
PBDO	OFF	OFF
Note: The Upload parameters are printed only when a single TN is specified.		

Connecting Apple Macintosh to the DAC

The Apple Macintosh can be connected with twisted pair wire to a port of a NT7D16 Data Access Card (DAC) to allow access to the Meridian 1 switching capability. The Macintosh can then access local or remote terminals, personal computers, hosts, and peripherals.

Figure 15 shows the 9-pin subminiature D (DB9) connection to the Macintosh. **Figure 16** shows the mini-8 DIN connection to the Macintosh.

Figure 15
Macintosh to DAC connection—9-pin subminiature D

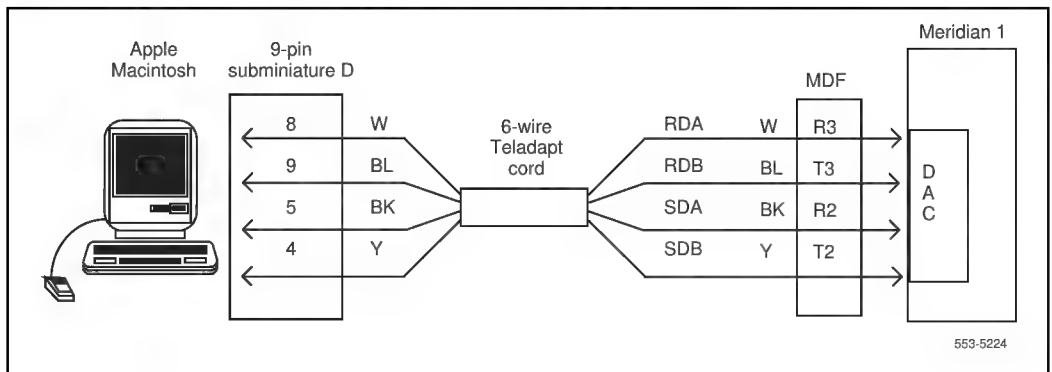
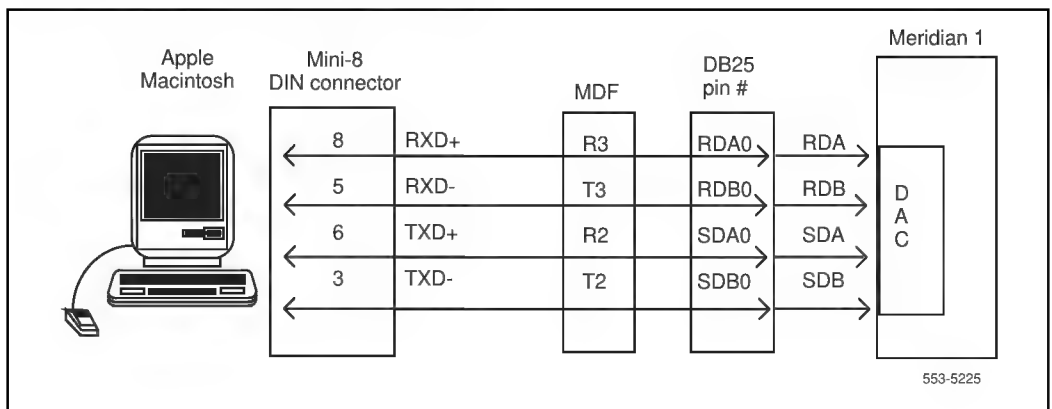


Figure 16
Macintosh to DAC connection—mini-8 DIN



Upgrading systems

The following explains when and how to upgrade your Meridian 1 system to support the DAC. Ports 0, 1, 2, and 3 of the DAC will work in any standard 16-pair IPE slot (connect directly to the MDF).

System options 21 and 21A upgrade

With release 7 of the NT8D1102 Backplane, the first card slot is fully cabled for the 24 pair to the I/O panel. The DAC can be installed directly into slot 0 with no cabling changes. If another slot is required, the upgrade must be made. Follow this procedure to upgrade the cabling for card slots one through nine.

Note 1: Three new NT8D81AA cable/filter assemblies are required.

Note 2: Cables are designated by the letter of the I/O panel cutout where the 50-pin cable connector is attached. The 20-pin connectors are labeled 1, 2, and 3.

Note 3: The locations for the cable connectors are designated by the slot number (L0-L9), and the shroud row (1, 2, and 3).

- 1** Remove cable C from the backplane and connect ends C-1, C-2, and C-3 to L2-1, L2-2, and L2-3.
- 2** Add cable D to the I/O panel by connecting ends D-1, D-2, and D-3 to L3-1, L3-2, and L3-3.
- 3** Move cable end E-3 to L4-3.
- 4** Remove cable F from the backplane and connect ends F-1, F-2, and F-3 to L5-1, L5-2, and L5-3.
- 5** Add cable G to the I/O panel by connecting ends G-1, G-2, and G3 to L6-1, L6-2, and L6-3.
- 6** Move cable end H-3 to L7-3.
- 7** Remove cable K from the backplane and connect ends K-1, K-2, and K-3 to L9-1, L9-2, and L9-3.
- 8** Add cable L to the I/O panel by connecting ends L-1, L-2, and L3 to L9-1, L9-2, and L9-3.

Be sure to re-label the MDF to show that the module has been upgraded to allow for one cable per peripheral equipment (PE slot). The resulting backplane and cable arrangement should look like this:

Backplane slot-connector	I/O panel cable position
L0	A
L1	B
L2	C
L3	D (new cable)
L4	E
L5	F
L6	G (new cable)
L7	H
L8	K
L9	L (new cable)

You can also upgrade the first four PE slots only. This requires only one NT8D81AA cable assembly. Perform the following procedure:

- 1** Leave cable A as is in slot L0.
- 2** Move cable end B-3 to L1-3.
- 3** Remove cable C from the backplane and connect ends C-1, C-2, and C-3 to L2-1, L2-2, and L2-3.
- 4** Add cable D to the I/O panel by connecting ends D-1, D-2, and D-3 to L3-1, L3-2, and L3-3.

Cables E, F, H, and K remain the same. Cable positions G and L are open for further expansion. Be sure to re-label the MDF to show that the module has been upgraded to provide one cable for each PE slot.

System options 51, 61, 71, and 81 upgrade

With release 4 of the NT8D3701 Backplane, the four slots are fully cabled for the 24 pair to the I/O panel. The DAC can be installed directly into slots 0, 4, 8, and 12 with no cabling changes. If other slots are required, the upgrade must be made. Follow this procedure to upgrade your cabling. You can upgrade the cabling segment-by-segment, or the entire module at one time.

Note 1: Four NT8D81AA cable/filter assemblies are required to upgrade the entire module, one assembly per segment.

Note 2: Cables are designated by the letter of the I/O panel cutout where the 50-pin cable connector is attached. The 20-pin connectors are labeled 1, 2, and 3.

Note 3: The locations for the cable connectors are designated by the slot number (L0-L9), and the shroud row (1, 2, and 3).

Segment 0

- 1 Leave cable A as is in slot L0.
- 2 Move cable end B-3 to L1-3.
- 3 Remove cable C from the backplane and connect ends C-1, C-2, and C-3 to L2-1, L2-2, and L2-3.
- 4 Add cable D to the I/O panel by connecting ends D-1, D-2, and D-3 to L3-1, L3-2, and L3-3.

Segment 1

- 1 Leave cable E as is in slot L4.
- 2 Move cable end F-3 to L5-3.
- 3 Remove cable G from the backplane and connect ends G-1, G-2, and G-3 to L6-1, L6-2, and L6-3.
- 4 Add cable H to the I/O panel by connecting ends H-1, H-2, and H-3 to L7-1, L7-2, and L7-3.

Segment 2

- 1 Leave cable K as is in slot L8.
- 2 Move cable end L-3 to L9-3.
- 3 Remove cable M from the backplane and connect ends M-1, M-2, and M-3 to L10-1, L10-2, and L10-3.
- 4 Add cable N to the I/O panel by connecting ends N-1, N-2, and N-3 to L11-1, L11-2, and L11-3.

Segment 3

- 1 Leave cable R as is in slot L12.
- 2 Move cable end S-3 to L13-3.
- 3 Remove cable T from the backplane and connect ends T-1, T-2, and T-3 to L14-1, L14-2, and L14-3.
- 4 Add cable U to the I/O panel by connecting ends U-1, U-2, and U-3 to L15-1, L15-2, and L15-3.

Be sure to re-label the MDF to show that the module has been upgraded to provide one cable for each PE slot. The resulting backplane and cable arrangement should look like this:

Backplane slot-connector	I/O panel cable position
L0	A
L1	B
L2	C
L3	D (new cable)
L4	E
L5	F
L6	G
L7	H (new cable)
L8	K
L9	L
L10	M
L11	N (new cable)
L12	R
L13	S
L14	T
L15	U (new cable)